Portsmouth Quadrangle, Maine

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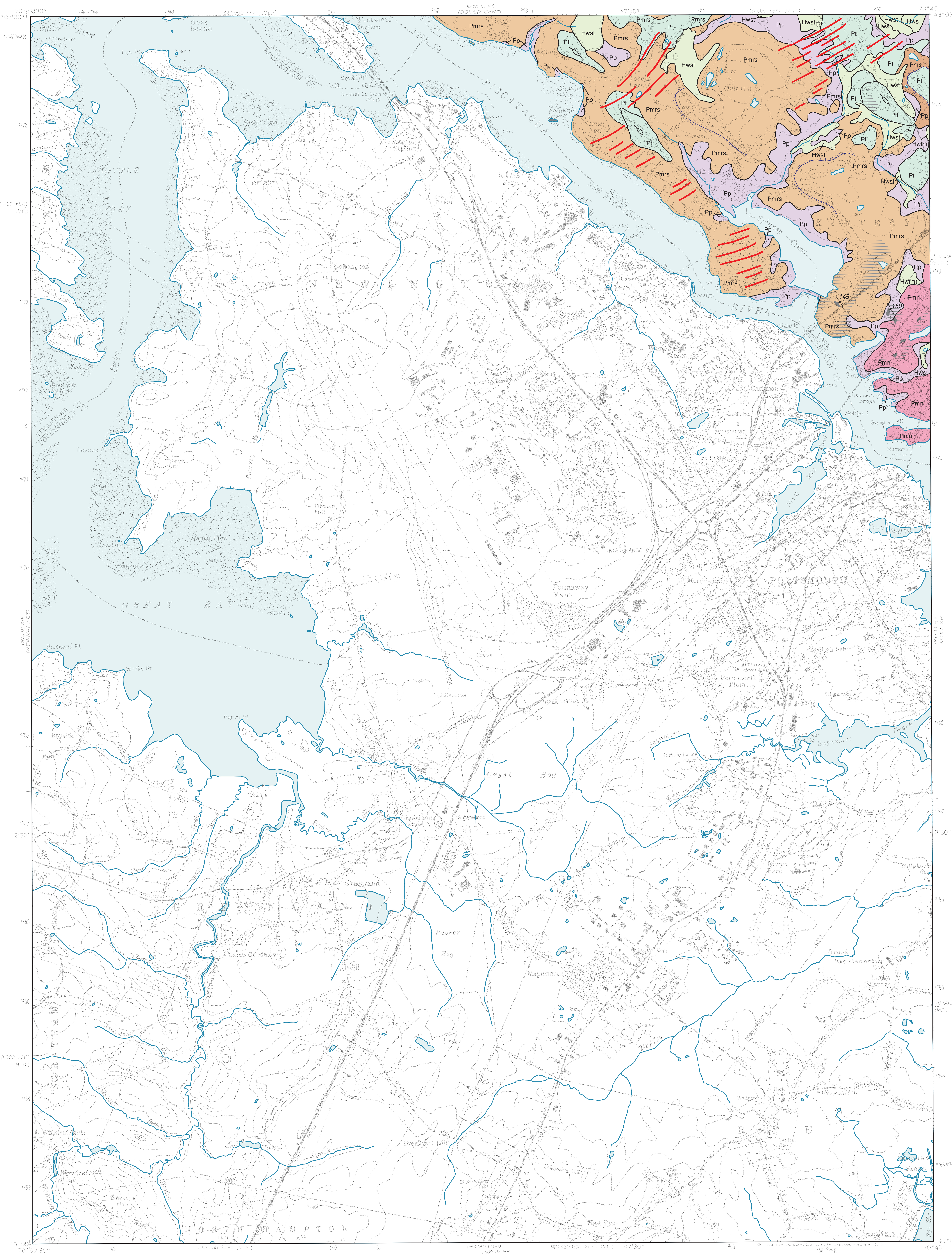
Surficial Geology



SOURCES OF INFORMATION

Surficial geologic mapping by Geoffrey W. Smith completed during the 1986 field season; funding for this work provided by the U. S. Geological Survey COGEOMAP program. Wetlands data provided in part by Cornelia C. Cameron, U.S. Geological Survey, 1987. Geologic unit designations and contacts revised and matched to adjacent quadrangles in 1999 by MGS geologists.

Quadrangle Location

SCALE 1 : 24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Portsmouth quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not impute responsibility for any present or potential effects on the natural resources.

Hws — **Wetland, swamp*** - Peat, silt, clay, and sand. Poorly drained area with variable tree cover, often with standing water.

Hwfm — **Wetland, freshwater marsh*** - Peat, silt, clay, and sand. Poorly drained grassland, often with standing water.

Pmn — **Marine nearshore deposits** - Thin, discontinuous till, water-laid sediments, and/or wetland deposits overlying bedrock. Occurs in coastal areas where glacial sediments were largely eroded and redeposited during regressive phase of late-glacial marine submergence. Bedrock outcrops are locally abundant.

Pms — **Marine shoreline deposit** - Predominantly sand with minor gravel. Consists of beach deposits formed during stillstand of relative sea level in regressive phase of marine submergence. Thickness variable, from less than 3 m in beach ridges to more than 10 m in aprons around eroded drumlins.

Pmrs — **Marine regressive sand deposits** - Massive to stratified and cross-stratified, well-sorted brown to gray-brown sand. Generally has gradational basal contact with Pp. Thickness between 1 and 5 m. Deposited during regressive phase of marine submergence.

Pp — **Presumpscot Formation** - Massive to laminated, gray and blue-gray (weathering brown) silt and silty clay. Locally may contain boulders, sand, and gravel. Occurs as blanket deposit over bedrock and older glacial sediments. Variable thickness, from less than 1 m to more than 50 m. Deposited during period of late-glacial marine submergence.

Pt — **Till** - Gray to gray-brown poorly sorted mixture of silt, sand, pebbles, cobbles, and boulders. Forms a blanket deposit over bedrock, and is inferred to underlie younger sediments where not exposed at surface. Thin over topographic highs; thickens in topographic lows. May occur in and over end moraines (Pem). Averages 3 to 5 m in thickness.

Ptl — **Lodgement till** - Same materials as till. Mapped in areas of streamlined hills (drumlins) where till may be up to 30 m thick.

Bedrock outcrops - Gray areas indicate barren ledge. Gray dots show locations of individual outcrops (not mapped where access is poor). Ruled pattern indicates areas where surficial materials are generally thin (less than 1-2 m) and bedrock exposures are common. Outcrops are mapped in part from aerial photographs.

Contact - Boundary between map units (dashed where approximate).

Scarp - Abrupt break in slope. Formed by wave erosion during marine submergence, or cut by streams.

Drumlin - Glacially streamlined hill. Symbol shows direction of long axis.

135 **Glacial striation locality** - Arrow indicates ice-movement direction inferred from striations (scratches on bedrock caused by glacial abrasion).

End moraine - Ridge of sand and gravel or till deposited at margin of glacier. May be largely buried by younger sediments.

*NOTE: Wetland symbols followed by "t" indicate areas where peat deposits probably do not constitute a significant commercial resource, either because they are thin (< 1.5 m), or they have an ash content greater than 25 percent. Symbols followed by "p" indicate peat deposits that are thicker (generally > 1.5 m), with ash content less than 25 percent, and thus may be suitable for commercial applications.

USES OF SURFICIAL GEOLOGY MAPS

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the products of postglacial geologic processes, such as river floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the areal distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of glacial lakes or the glacial sea, now long gone from the state. This glacial geologic history of the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial geology maps are often best used in conjunction with related maps such as surficial materials maps or significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to surficial geology. Construction projects such as locating new roads, excavating foundations, or siting new homes may be better planned with a good knowledge of the surficial geology of the site. Refer to the list of related publications below.

OTHER SOURCES OF INFORMATION

1. Smith, G. W., 1999, Surficial geology of the Portsmouth 7.5-minute quadrangle, York County, Maine: Maine Geological Survey, Open-File Report 99-127, 5 p.
2. Smith, G. W., 1998, Surficial materials of the Portsmouth quadrangle, Maine: Maine Geological Survey, Open-File Map 98-162.
3. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)
4. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.
5. Thompson, W. B., Crossen, K. J., Borns, H. W., Jr., and Andersen, B. G., 1989, Glaciomarine deltas of Maine and their relation to late Pleistocene-Holocene crustal movements, *in* Anderson, W. A., and Borns, H. W., Jr. (eds.), Neotectonics of Maine: Maine Geological Survey, Bulletin 40, p. 43-67.